

We claim:

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1. An improved auxiliary shelf mechanism for vertically and horizontally positioning an auxiliary shelf, including a means for attaching the auxiliary shelf to a desk so that the auxiliary shelf may be movably positioned relative to the desk, wherein

5 the improvement comprises:

an articulating arm mechanism comprising:

- 10 (a) a mounting bracket, the mounting bracket having a front end and a back end, the front end being closer to the front of the desk than the back end;
- (b) an upper arm pivotally connected to the mounting bracket at a first pivot point, the rear of the upper arm being defined as the end of the upper arm closest to the mounting bracket;
- (c) a shelf bracket pivotally connected to the upper arm at a second pivot point; the front of the upper arm being defined as the end of the upper arm closest to the shelf bracket;
- 15 (d) a side arm pivotally connected to the shelf bracket at a third pivot point; the side arm being further attached to the mounting bracket at a fourth pivot point; the side arm having within it a first opening such that the side arm can be pivoted relative to the mounting bracket about the fourth pivot point and can be reciprocatingly moved relative to the fourth pivot point; the front of the
- 20 side arm being defined as the end closest to the third pivot point, and the rear of the side arm being defined as the end opposite from the front;
- (e) a stopping means, the stopping means having a first side facing towards the rear of the side arm, such that when the side arm moves laterally relative to the

fourth pivot point, the rear of the side arm can contact the first side of the
stopping means;

wherein the side arm and the upper arm are not substantially parallel to each other.

- 5 2. The auxiliary shelf mechanism of claim 1, wherein the third pivot point is
disposed beneath the second pivot point.
- 10 3. The auxiliary shelf mechanism of claim 1, wherein the fourth pivot point is
disposed beneath the first pivot point.
4. The auxiliary shelf mechanism of claim 1, wherein the fourth pivot point is
disposed beneath the first pivot point, and the third pivot point is disposed beneath the
second pivot point.
- 15 5. The auxiliary shelf mechanism of claim 1, wherein the first side of the stopping
means is concave.
6. The auxiliary shelf mechanism of claim 1, wherein the first and fourth pivot
points are closer together than the second and third pivot points.
- 20 7. The auxiliary shelf mechanism of claim 1, wherein the fourth pivot point is
disposed beneath the first pivot point, and the third pivot point is disposed beneath the
second pivot point, and the first side of the stopping means is concave.

8. The auxiliary shelf mechanism of claim 1, wherein the articulating arm mechanism further comprises a lower arm, the lower arm being pivotally attached to the upper arm at a fifth pivot point, the fifth pivot point being disposed between the first and second pivot points, the lower arm being further attached to the mounting bracket at the fourth pivot point, the lower arm further having within it a second opening, such that the lower arm can pivot about the fourth pivot point and can be reciprocatingly moved relative to the fourth pivot point.

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9. The auxiliary shelf mechanism of claim 1, wherein the articulating arm mechanism has two side arms and two stopping means, wherein the rear of each side arm can contact the first face of its corresponding stopping means.

10. The auxiliary shelf mechanism of claim 9, wherein the two stopping means are connected to each other.

11. The auxiliary shelf mechanism of claim 1, wherein the position of the stopping means is adjustable between a first position and a second position, the first position being closer to the front end of the mounting bracket than the second position, and the second position being closer to the back end of the mounting bracket than the first position.

12. The auxiliary shelf mechanism of claim 11, wherein the position of the stopping means can be fixed at either the first position, or the second position, or at any position between the first and second positions.

5 13. The auxiliary shelf mechanism of claim 6, wherein the position of the stopping means is adjusted by means of a threaded screw mechanism.

14. The auxiliary shelf mechanism of claim 1, wherein the position of the stopping means is adjusted by means of a lever mechanism, the lever mechanism comprising an
10 adjustment lever, a setting bracket, and a sliding bracket.

15. The auxiliary shelf mechanism of claim 1, wherein the upper arm is connected to the mounting bracket by a first pivot rod and to the shelf bracket by a second pivot rod, and further wherein the side arm is connected to the shelf bracket by a third pivot rod and
15 to the mounting bracket by a bolt.

16. The auxiliary shelf mechanism of claim 1, wherein the side arm may be fixed into position relative to the mounting bracket with a fixing means.

20 17. The auxiliary shelf mechanism of claim 16, wherein the side arm may be fixed into place with a locking mechanism.

18. The auxiliary shelf mechanism of claim 17, wherein the locking means is a locking knob.

19. The auxiliary shelf mechanism of claim 1, wherein the side arm is fixed into position by means of friction between the end of the side arm and the first face of the stopping means.

20. The auxiliary shelf mechanism of claim 1, wherein the side arm is fixed into position by means of interaction between interconnecting projections on the end of the side arm and the first face of the stopping means.

21. The auxiliary shelf mechanism of claim 1, wherein at least one stopping means is attached to an inside face of the mounting bracket, and further wherein the first face of at least one stopping means is angled outwards towards the inside face of the mounting bracket to which the stopping means is attached.

22. The auxiliary shelf mechanism of claim 1, wherein the rear end of the side arms and the first face of the stopping means comprise complementary series of interlocking teeth.

23. The auxiliary shelf mechanism of claim 5, wherein the rear end of the side arm consists of a side-arm cam pivotally connected to the end of the side arm, the side-arm

cam having a convex face which complements the concave face of the stopping means with which it comes in contact.

24. The auxiliary shelf mechanism of claim 1, wherein the articulating arm
5 mechanism comprises means for rotating it relative to the desk.

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25. The auxiliary shelf mechanism of claim 24, wherein the means for rotating the
articulating arm mechanism relative to the desk comprises a swivel mechanism attached
to the mounting bracket in combination with a mounting track to which the mounting
10 bracket is slidably connected, either directly or indirectly.

26. The auxiliary shelf mechanism of claim 1, wherein:
(a) there are two side arms;
(b) there are two stopping means, optionally connected to one another;
(c) the first face of each stopping means is concave;
15 (d) each stopping means is attached to an inside face of the mounting bracket, and
further wherein the first face of each stopping means is angled outwards
towards the inside face of the mounting bracket to which each stopping means
is attached so that the end of each side arm can contact a stopping means and
20 an inside face of the mounting bracket simultaneously;
(e) the fourth pivot point is disposed beneath the first pivot point, and the third
pivot point is disposed beneath the second pivot point;

(f) the articulating arm mechanism may be rotated relative to the desk by means of a swivel mechanism attached to the mounting bracket in combination with a mounting track to which the mounting bracket is slidably connected, either directly or indirectly.

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27. An articulating arm mechanism for connecting a shelf to a desk comprising:

- (a) a mounting bracket, the mounting bracket having a front end and a back end, the front end being closer to the front of the desk than the back end;
- (b) an upper arm pivotally connected to the mounting bracket at a first pivot point, the rear of the upper arm being defined as the end of the upper arm closest to the mounting bracket;
- (c) a shelf bracket pivotally connected to the upper arm at a second pivot point; the front of the upper arm being defined as the end of the upper arm closest to the shelf bracket;
- (d) a side arm pivotally connected to the shelf bracket at a third pivot point; the side arm being further attached to the mounting bracket at a fourth pivot point; the side arm having within it a first opening such that the side arm can be pivoted relative to the mounting bracket about the fourth pivot point and can be reciprocatingly moved relative to the fourth pivot point; the front of the side arm being defined as the end closest to the third pivot point, and the rear of the side arm being defined as the end opposite from the front;

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(e) a stopping means, the stopping means having a first side facing towards the rear of the side arm, such that when the side arm moves laterally relative to the fourth pivot point, the rear of the side arm can contact the first side of the stopping means;

5 wherein the side arm and the upper arm are not parallel to each other.

28. The articulating arm mechanism of claim 27, wherein the third pivot point is disposed beneath the second pivot point.

10 29. The articulating arm mechanism of claim 27, wherein the fourth pivot point is disposed beneath the first pivot point.

30. The articulating arm mechanism of claim 27, wherein the fourth pivot point is disposed beneath the first pivot point, and the third pivot point is disposed
15 beneath the second pivot point.

31. The articulating arm mechanism of claim 27, wherein the first side of the stopping means is concave.

20 32. The articulating arm mechanism of claim 27, wherein the first and fourth pivot points are closer together than the second and third pivot points.

33. The articulating arm mechanism of claim 27, wherein the fourth pivot point is disposed beneath the first pivot point, and the third pivot point is disposed beneath the second pivot point, and the first side of the stopping means is concave.

5 34. The articulating arm mechanism of claim 27, wherein the articulating arm mechanism further comprises a lower arm, the lower arm being pivotally attached to the upper arm at a fifth pivot point, the fifth pivot point being disposed between the first and second pivot points, the lower arm being further attached to the mounting bracket at the fourth pivot point, the lower arm further having within it a second opening, such that the
10 lower arm can pivot about the fourth pivot point and can be reciprocatingly moved relative to the fourth pivot point.

35. The articulating arm mechanism of claim 27, wherein the articulating arm mechanism has two side arms and two stopping means, wherein the rear of each side arm
15 can contact the first face of its corresponding stopping means.

36. The articulating arm mechanism of claim 35, wherein the two stopping means are connected to each other.

20 37. The articulating arm mechanism of claim 36, wherein at least one of the first sides of each stopping means is concave.

38. The articulating arm mechanism of claim 27, wherein the stopping means is movable between a first position and a second position, the first position being closer to the front end of the mounting bracket than the back position, and the second position being closer to the back end of the mounting bracket than the first position.

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39. The articulating arm mechanism of claim 38, wherein the position of the stopping means can be fixed at either the first position, or the second position, or at any position between the first and second positions.

10 40. The articulating arm mechanism of claim 39, wherein the position of the stopping means is adjusted by means of a threaded screw mechanism.

41. The articulating arm mechanism of claim 39, wherein the position of the stopping means is adjusted by means of a lever mechanism, the lever mechanism
15 comprising an adjustment lever, a setting bracket, and a sliding bracket.

42. The articulating arm mechanism of claim 27, wherein the upper arm is connected to the mounting bracket by a first pivot rod and to the shelf bracket by a second pivot rod, and further wherein the side arm is connected to the shelf bracket by a
20 third pivot rod and to the mounting bracket by a bolt.

43. The articulating arm mechanism of claim 27, wherein the side arm may be fixed into position relative to the mounting bracket with a fixing means.

44. The articulating arm mechanism of claim 43, wherein the side arm may be fixed into position with a locking means.

5 45. The articulating arm mechanism of claim 44, wherein the locking means is a locking knob.

46. The articulating arm mechanism of claim 27, wherein the side arm is fixed into position by means of friction between the end of the side arm and the first face of
10 stopping means.

47. The articulating arm mechanism of claim 27, wherein the side arm is fixed into position by means of interaction between interconnecting projections on the end of the side arm and the first face of the stopping means.

15 48. The articulating arm mechanism of claim 27, wherein at least one stopping means is attached to an inside face of the mounting bracket, and further wherein the concave face of at least one stopping means is angled outwards towards the inside face of the mounting bracket to which the stopping means is attached.

20 49. The articulating arm mechanism of claim 27, wherein the rear end of the side arm and the concave face of the stopping means comprise complementary series of interlocking teeth.

50. The articulating arm mechanism of claim 31, wherein the rear end of the side arm consists of a side-arm cam pivotally connected to the end of the side arm, the side-arm cam having a convex face which complements the first face of the stopping means with which it comes in contact.

51. The articulating arm mechanism of claim 27, wherein the articulating arm mechanism further comprises a means for rotating it relative to the desk.

52. The articulating arm mechanism of claim 51, wherein the means for rotating it relative to the desk comprises a swivel mechanism attached to the mounting bracket.

53. The articulating arm mechanism of claim 27, wherein:

- (a) there are two side arms;
- (b) there are two stopping means, optionally connected to one another;
- (c) the first face of each stopping means is concave;
- (d) each stopping means is attached to an inside face of the mounting bracket, and further wherein the first face of each stopping means is angled outward towards the inside face of the mounting bracket to which each stopping means is attached so that the end of each side arm can contact a stopping means and the inside face of the mounting bracket simultaneously

(e) the fourth pivot point is disposed beneath the first pivot point, and
the third pivot point is disposed beneath the second pivot point;
and

(f) the articulating arm mechanism may be rotated relative to the desk
by means of a swivel mechanism attached to the mounting bracket
in combination with a mounting track to which the mounting
bracket is slidably connected, either directly or indirectly.

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comprising:

(a) a mounting bracket, the mounting bracket having a front end and a back end,
the front end being closer to the front of the desk than the back end;

(b) an upper arm pivotally connected to the mounting bracket at a first pivot point,
the rear of the upper arm being defined as the end of the upper arm closest to
the mounting bracket;

(c) a shelf bracket pivotally connected to the upper arm at a second pivot point;
the front of the upper arm being defined as the end of the upper arm closest to
the shelf bracket;

(d) a side arm pivotally connected to the shelf bracket at a third pivot point; the
side arm being further attached to the mounting bracket at a fourth pivot point;
the side arm having within it a first opening such that the side arm can be
pivoted relative to the mounting bracket about the fourth pivot point and can

be reciprocatingly moved relative to the fourth pivot point; the front of the side arm being defined as the end closest to the third pivot point, and the rear of the side arm being defined as the end opposite from the front;

(e) a stopping means, the stopping means having a first side facing towards the rear of the side arm, such that when the side arm moves horizontally relative to the fourth pivot point, the rear of the side arm can contact the first side of the stopping means;

wherein the side arm and the upper arm are substantially not parallel to each other; and further wherein the position of the stopping means relative to the side arm and the shape of the first side of the stopping means are such that regardless of the angle of the side arm to the ground, the angle of the shelf bracket relative to horizontal remains constant.

55. An improved auxiliary shelf mechanism including an auxiliary shelf having a top surface and a bottom surface, and a linkage to attach the auxiliary shelf to a desk so that the auxiliary shelf may be moved horizontally and/or vertically relative to the desk, wherein the improvement comprises attaching the linkage to the auxiliary shelf so that no part of the auxiliary shelf mechanism extends below the bottom surface of the auxiliary shelf.

56. The auxiliary shelf mechanism of claim 55, wherein the linkage is a parallelogram linkage.

57. The auxiliary shelf mechanism of claim 55, wherein the linkage is a non-parallelogram linkage.

5 58. An improved auxiliary shelf mechanism for vertically and horizontally positioning an auxiliary shelf, including a means for attaching the auxiliary shelf to a desk so that the auxiliary shelf may be moved horizontally relative to the desk, wherein the improvement comprises:

an articulating arm mechanism comprising:

- 10 (a) a mounting bracket, the mounting bracket having a front end and a back end, the front end being closer to the front of the desk than the back end; .
- (b) an upper arm pivotally connected to the mounting bracket at a first pivot point, the rear of the upper arm being defined as the end of the upper arm closest to the mounting bracket;
- 15 (c) a shelf bracket pivotally connected to the upper arm at a second pivot point; the front of the upper arm being defined as the end of the upper arm closest to the shelf bracket;
- (d) a side arm pivotally connected to the shelf bracket at a third pivot point; the third pivot point being disposed beneath the second pivot point; the side arm being further attached to the mounting bracket at a fourth pivot point, the fourth pivot point being disposed beneath the first pivot point; the side arm having within it a first opening such that the side arm can be pivoted relative to the mounting bracket about the fourth pivot point and can be
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reciprocatingly moved relative to the fourth pivot point; the front of the side arm being defined as the end closest to the third pivot point, and the rear of the side arm being defined as the end opposite from the front;

(e) a stopping means, the stopping means having a first side with a concave shape facing towards the rear of the side arm, such that when the side arm moves laterally relative to the fourth pivot point, the rear of the side arm can contact the concave first side of the stopping means;

wherein the stopping means is movable between a first position and a second position, the first position being closer to the front end of the mounting bracket than the second position, and the second position being closer to the back end of the mounting bracket than the first position.

59. The auxiliary shelf mechanism of claim 58, wherein the position of the stopping means can be fixed at either the first position, or the second position, or at any position between the first and second positions.

60. The auxiliary shelf mechanism of claim 59, wherein the position of the stopping means is adjusted by means of a threaded screw mechanism.

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